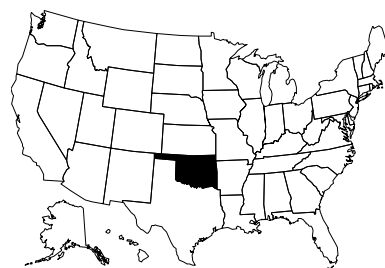


OKLAHOMA

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Program Description

The Oklahoma Water Resources Board (OWRB) has many monitoring programs. In 1998, the State Legislature directed the OWRB to oversee certain state water quality monitoring activities to determine compliance with Oklahoma's Water Quality Standards (OWQS). Specifically, the OWRB was charged with coordinating all monitoring under a standing cooperative agreement with the USGS, conducting a Comprehensive Beneficial Use Monitoring Program (BUMP), and developing Use Support Assessment Protocols (USAPS) to ensure the consistent data interpretation of beneficial use support. The overall goal of BUMP is to document beneficial use impairments, identify impairment sources (if possible), detect water quality trends, provide needed information for the OWQS and facilitate the prioritization of pollution control activities. River and stream monitoring is one of five key elements of BUMP.

So far, OWRB's biological monitoring is related only to special projects, such as biocriteria development or the occasional fish tissue study. However, BUMP is a developing program and there is intent to expand biological monitoring in the near future. Presently, there are fixed and rotating stations at which chemistry and flow information may be collected. The OWRB is currently monitoring almost 200 sites on a monthly basis. These sites are segregated into two discrete types of monitoring activities. The first monitoring activity is focuses on fixed station monitoring on rivers and streams. In general, at least one sample station is located in each of 67 watersheds. Following consultation with other appropriate state environmental agencies, the OWRB originally identified 84 fixed sites; that number has now grown to 100. The second component of river and stream monitoring focuses on water quality sampling stations whose location will rotate on an annual basis. Stations and identified monitoring parameters were based upon Oklahoma's 303(d) list and the monitoring requirements of other state environmental agencies. Monitoring parameters are specific for each stream segment.

Oklahoma DEQ's fish monitoring program has been discontinued but provided a wealth of information concerning statewide fish distribution. Improvements in Oklahoma's water quality monitoring programs are being developed and implemented in order to provide more consistent and reliable information related to the condition of aquatic resources (including quality habitat alteration, and impacts of polluted runoff and point source discharges). Unfortunately, much of the monitoring information in Oklahoma is fragmentary and incompatible because it is collected through programs that are designed and conducted for differing objectives.

Documentation and Further Information

The State of Oklahoma Water Quality Assessment Report, 2000 Edition, November 2000:
http://www.deq.state.ok.us/WQDnew/305b_303d/2000_305b_Report_Final.pdf

Status of Water Quality Monitoring in Oklahoma, 2000 Final Report to the Oklahoma Legislature:
www.owrb.state.ok.us/reports/OkWqStatus2000.pdf

Oklahoma Water Resources Board, Chapter 46 of Implementation of Oklahoma's WQS, effective August 2001:
<http://www.owrb.state.ok.us/rules/Chap46.pdf>

SOP for Field Sampling Efforts of the OK Water Resources Board Beneficial Use Monitoring Program, June 2001:
http://www.owrb.state.ok.us/reports/BUMP_SOPFY-01.pdf

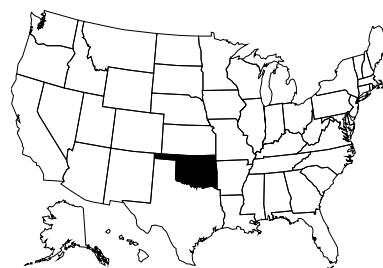
Oklahoma's Nonpoint Source Management Program and Nonpoint Source Assessment Report, FINAL DRAFT:
http://www.okcc.state.ok.us/Divisions/Water_Quality/Reports/REPORT078.pdf

Conduct your own "Biological Monitoring" search for additional documents using: <http://www.soonersearch.odl.state.ok.us/>

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Programmatic Elements

Uses of bioassessment within overall water quality program*	<input type="checkbox"/>	problem identification (screening)
	<input type="checkbox"/>	nonpoint source assessments
	<input type="checkbox"/>	monitoring the effectiveness of BMPs
	<input checked="" type="checkbox"/>	ALU determinations/ambient monitoring
	<input checked="" type="checkbox"/>	promulgated into state water quality standards as biocriteria
	<input type="checkbox"/>	support of antidegradation
	<input type="checkbox"/>	evaluation of discharge permit conditions
	<input type="checkbox"/>	TMDL assessment and monitoring
	<input type="checkbox"/>	other:
Applicable monitoring designs	<input type="checkbox"/>	targeted (i.e., sites selected for specific purpose)
	<input type="checkbox"/>	fixed station (i.e., water quality monitoring stations)
	<input type="checkbox"/>	probabilistic by stream order/catchment area
	<input checked="" type="checkbox"/>	probabilistic by ecoregion, or statewide (<i>comprehensive use throughout jurisdiction</i>)
	<input type="checkbox"/>	rotating basin
	<input type="checkbox"/>	other:

*Several possibilities exist, but currently only use-support decisions and use assignments are done with bioassessments.

Stream Miles

Total miles	78,778
<i>(State based determination - waterbody identifications)</i>	
Total perennial miles	22,386
Total miles assessed for biology	13,313
fully supporting for 305(b)**	—
partially/non-supporting for 305(b)**	—
listed for 303(d)**	—
number of sites sampled	3,391
number of miles assessed per site	~4 (site specific)

**Much of Oklahoma's efforts are still in the development stages. The new 305(b) and 303(d) are not complete and there have been significant changes in protocol since last completed; thus the data from past reports are no longer relevant. The new 305(b) and 303(d) reports should be complete sometime in 2002.

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	ALU subcategories	
ALU designations in state water quality standards	Habitat Limited Aquatic Community (least restrictive), Warm Water A.C., Cool Water A.C. (most restrictive), Trout Fishery (anti-degradation limitation)	
Narrative Biocriteria in WQS	Formal/informal numeric procedures used to support narrative biocriteria exist for specific ecoregions only.	
Numeric Biocriteria in WQS	Only for specific ecoregions; biological use-support thresholds found in 785:46-15 (WQS implementation).	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	<input checked="" type="checkbox"/>	assessment of aquatic resources
	<input type="checkbox"/>	cause and effect determinations
	<input type="checkbox"/>	permitted discharges
	<input type="checkbox"/>	monitoring (e.g., improvements after mitigation)
	<input type="checkbox"/>	watershed based management
Uses of bioassessment/biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	none	

Reference Site/Condition Development

Number of reference sites	66 - 132 total (will increase as number of ecoregions are completed)	
Reference site determinations	<input type="checkbox"/>	site-specific
	<input type="checkbox"/>	paired watersheds
	<input checked="" type="checkbox"/>	regional (aggregate of sites)
	<input type="checkbox"/>	professional judgment
	<input checked="" type="checkbox"/>	other: least impacted, no point sources
Reference site criteria	Reference sites are defined by the least impacted version of a stream type in a particular ecoregion. Specific criteria is under development.	
Characterization of reference sites within a regional context	<input type="checkbox"/>	historical conditions
	<input checked="" type="checkbox"/>	least disturbed sites
	<input type="checkbox"/>	gradient response
	<input type="checkbox"/>	professional judgment
	<input type="checkbox"/>	other:
Stream stratification within regional reference conditions	<input checked="" type="checkbox"/>	ecoregions (or some aggregate)
	<input type="checkbox"/>	elevation
	<input checked="" type="checkbox"/>	stream type
	<input type="checkbox"/>	multivariate grouping
	<input type="checkbox"/>	jurisdictional (i.e., statewide)
	<input type="checkbox"/>	other:
Additional information	<input checked="" type="checkbox"/>	reference sites linked to ALU
	<input type="checkbox"/>	reference sites/condition referenced in water quality standards
	<input checked="" type="checkbox"/>	some reference sites represent acceptable human-induced conditions

Field and Lab Methods

Assemblages assessed	<input checked="" type="checkbox"/>	benthos (<100 samples/year; single observation, limited sampling)
	<input checked="" type="checkbox"/>	fish (<100 samples/year; single observation, limited sampling)
	<input type="checkbox"/>	periphyton
	<input type="checkbox"/>	other:
Benthos		
sampling gear		dipnet, kick net (1 meter); 500-600 micron mesh
habitat selection		riffle/run (cobble) and woody debris
subsample size		100 count
taxonomy		genus
Fish		
sampling gear		backpack electrofisher, seine; 1/4" mesh
habitat selection		all habitats contained within the "representative" reach of 200 - 400 meters
sample processing		anomalies and taxonomic identification
subsample		none
taxonomy		species
Habitat assessments		quantitative measurements; performed independent of bioassessments (see <i>Oklahoma Water Resource Board Technical Report 99-3</i> for more information)
Quality assurance program elements		standard operating procedures, quality assurance plan, taxonomic proficiency checks and specimen archival

Data Analysis and Interpretation

Data analysis tools and methods	<input checked="" type="checkbox"/>	summary tables, illustrative graphs
	<input type="checkbox"/>	parametric ANOVAs
	<input type="checkbox"/>	multivariate analysis
	<input checked="" type="checkbox"/>	biological metrics (<i>aggregate metrics into an index</i>)
	<input type="checkbox"/>	disturbance gradients
	<input type="checkbox"/>	other:
Multimetric thresholds		
transforming metrics into unitless scores		cumulative distribution function (ecoregion dependent)
defining impairment in a multimetric index		cumulative distribution function (ecoregion dependent)
Evaluation of performance characteristics	<input checked="" type="checkbox"/>	repeat sampling (<i>site validation collections and habitat assessments</i>)
	<input type="checkbox"/>	precision
	<input type="checkbox"/>	sensitivity
	<input type="checkbox"/>	bias
	<input type="checkbox"/>	accuracy
Biological data		
Storage		MS Access and/or Excel formats
Retrieval and analysis		application dependent, spreadsheet driven (no large statistical treatment yet); in the process of pulling existing data from other agencies to help develop a program